

$\frac{1}{2}$ inch; 6th, 11th. Springfield, Mass., 5th, 6th. New London, 5th, 6th. Boston, 27th. Burlington, Vt., 14th, 26th. New Haven, 5th. Wabash, Ind., 5th. Nora Springs, Ia., 20th. Clay Centre, Kan., 18th, $\frac{1}{4}$ inch. Orono, Me., 5th, $\frac{1}{4}$ inch. Dexter, Me., 5th. Fallston, Md., 6th, thin film. Litchfield, Mich., 19th. Niles, Mich., 19th. Thornville, Mich., 24th. Clear Creek, Neb., 13th, 20th. Genoa, Neb., 13th, 18th, 24th. Howard, Neb., 18th, $\frac{1}{4}$ inch. Grafton, N. H., 5th, $\frac{1}{2}$ inch. Contoocookville, N. H., 5th, $\frac{1}{2}$ inch. Ruggles, Ohio, 11th. Charlotte, Vt., 5th, 27th. Accotink, Va., 6th. Johnsonville, Va., 6th. Derby Line, Vt., 5th, $\frac{1}{4}$ inch. Newport, Vt., 5th, $\frac{1}{4}$ inch. Stowe, Vt., 5th, $\frac{1}{4}$ to $\frac{1}{2}$ inch. Milford, N. H., 5th, $\frac{3}{4}$ inch. Warner, N. H., 5th, $\frac{1}{2}$ inch. Plymouth, N. H., 5th, $\frac{1}{4}$ to $\frac{1}{2}$ inch. Bradford, Pa., 5th, 1 inch. London, Province of Ontario, 5th, $\frac{1}{4}$ inch. British Columbia, 14th; cold weather has been very severe for several days; ice formed every night.

PRECIPITATION.

The general distribution of rain-fall for the month of October, 1881, is shown on chart No. III from the reports of over 500 stations. From the table in the left-hand corner of the chart is obtained a monthly average for each of the various districts, determined from the records (covering a period of many years) of Signal Service stations, and also a comparison of the present month with such averages. Upon examining the chart a decided excess in the monthly rain-fall is found to prevail over the central portion of the country, the departures ranging from 0.22 inch in the Eastern Gulf states to 4.52 inches in the Upper Mississippi valley. The area of deficiency is confined to the Atlantic coast and except a slight excess in the Middle Atlantic states prevails from the Canadian Maritime Provinces southwestward to include Florida, the departures ranging from 0.90 inch in New England to 4.00 inches in the Florida Peninsula. On Mt. Washington there appears to be a very large excess, the total monthly rain-fall measuring 18.38 inches. On the Pacific coast a comparison with the average shows a range of from normal in the South Pacific region to +1.68 inches in the North Pacific region. As a means of interesting comparison, the following maximum departures from the average are given for each year since 1872, together with the corresponding districts: 1873, large excess, New England and Middle Atlantic states; 1874, -3.85 inches, Western Gulf states and -3.10 inches, New England; 1875, -1.40 inches, Lower Missouri valley and Middle Atlantic states, and +1.30 inches, North Pacific region; 1876, +5.15 inches, South Atlantic states and -2.35 inches New England; 1877, +5.88 inches Western Gulf states; 1878, +2.35 inches, Minnesota; 1879, +3.18 inches, Eastern Gulf States; 1880, +3.36 inches, Florida Peninsula.

Deviations from Average Precipitation.—Under this heading departures exhibited by the reports from the regular Signal Service stations are shown in the table of comparative monthly rain-fall in the lower left-hand corner of chart No. III. The following items of importance in connection with this subject are reported by voluntary observers: *Connecticut*: Southington, monthly rain-fall considerably below the average for the past 11 years. *Indiana*: Wabash, monthly rain-fall double the average of several years past. *Illinois*: Riley, monthly rain-fall 4.53 inches above the average for the past 20 years and 0.24 inch greater than the largest rain-fall during that period. *Maine*: Gardiner, monthly rain-fall 1.90 below the average for the past 45 years. *Missouri*: St. Louis, Missouri Weather Service reports monthly rain-fall considerably above the average for the past 45 years. *New Hampshire*: Contoocookville, monthly rain-fall about 1.50 inches below the October average for the past 11 years. *New York*: Palermo, monthly rain-fall equals the normal or the average of the past 28 years. North Volney, monthly rain-fall 0.12 above the average of the past 9 years. *West Virginia*: Flemington, monthly rain-fall considerably less than the average and 1.00 inch less than that of October, 1880.

Special Heavy Rains.—1st, Mt. Ida, Ark., 2.00 inches in 6 hours and 50 minutes; Franklin, Ark., 3.48; Denison, Tex., 2.82; Eagle Pass, Tex., 3.18; Lexington, Mo., 3.83; Ft. Smith, Ark., 3.75. 1st and 2nd, Pierce City, Mo., 4.50; Brackettville, Tex., 13.08, of which 10.97 fell in 8 hours. 2d, Blooming Grove, Penn., 2.90; Toledo, 3.10 in 12 hours; Ft. Scott, Kansas, 1.80 in 20 minutes. 2d and 3d, Springfield, Ill., 5.74. 4th, Vevay, Ind., 1.20, in 40 minutes. 4th and 5th, Yates Centre, Kan., 2.40, during late night and early morning. 6th, Swanwick, Ill., 2.25, in 1 hour and 45 minutes. 6th and 7th, Manitowoc, Wis., 3.30. 8th, Laredo, Tex., 3.53. 9th, Anna, Ill., 3.20; Ft. Davis, Tex., 2.82. 11th, Northfield, Minn., 2.84. 11th and 12th, Neillsville, Wis., 3.20. 12th, St. Joseph, Mo., 3.63. 15th, Mt. Washington, 2.87. 16th and 17th, Nora Springs, Ia., 3.00. 17th, Charleston, Ill., 2.50; Grand Haven, 3.04; St. Joseph, Mo., 3.60. 18th, Eastport, Me., 2.76. 20th and 21st, Mayport, Fla., 3.41. 23d, Pensacola, Fla., 2.65; Galveston, 2.96. 24th and 25th, Brownsville, Tex., 3.35. 27th, Shreveport, 3.80. 27th and 28th, Vicksburg, 6.59; Fayette, Miss., 6.20. 28th, Charleston, Ill., 2.50. 29th and 30th, Highlands, N. C., 8.27. 30th and 31st, Emmitsburg, Md., 3.52.

Largest Monthly Rain-falls.—Mt. Washington, N. H., 18.38 inches; Brackettville, Tex., 16.17; New Ulm, Tex., 12.44; Nora Springs, Ia., 11.70; Kirksville, Mo., 11.30; St. Joseph, Mo., 11.24; Highlands, N. C., 10.83; Hannibal, Mo., 10.70; Edinburg, Tex., 10.54; Galveston, 10.33; Alpena, Mich., 10.25; Northport, Mich., 10.19; Springfield, Ill., 10.02; Vicksburg, 9.69; Madison, Wis., 9.10; Louisiana, Mo., 8.95; Macon, Mo., 8.88; Manitowoc, Wis., 8.81; Fayette, Miss., 8.80;

Emmitsburg, Md., 8.77; Embarrass, Wis., 8.75; Columbus, O., 8.64; Neillsville, Wis., 8.60; Carthage, Mo., 8.55; Yates Centre, Kan., 8.52; Toledo, 8.49; Ft. Smith, Ark., 8.41; Shelbyna, Mo., 8.40; Greenfield, Mo., 8.30; Shreveport, 8.28; Olympia, Wash. T., 8.18; Pierce City, Mo., 8.10; Cresco, Ia., 8.06; Keokuk, 8.01; Geneseo, Ill., 7.90; Grand Haven, 7.87; Neosho, Mo., 7.68; LaCrosse, 7.56; Litchfield, Mich. and Mt. Ida, Ark., 7.45; Niles, Mich., 7.41; Bolivar, Mo., and Coldwater, Mich., 7.40; Buffalo, 7.33; New Corydon, Ind., 7.31; Charleston, Ill. and O'Fallon, Mo., 7.39; Little Mountain, O., Monticello, Ia. and St. Louis, 7.21; Vevay, Ind., 7.20; Battle Creek, Mich., 7.17; Ft. Brown, Tex., 7.04; Muscatine, Ia., 7.03; Albany, Or., 7.00;

Smallest Monthly Rain-falls.—Wilcox, Ariz., Chico and Pajaro, Cal., Browns, Reno and Wells, Nev., and Kelton, Utah, none; Casa Grande and Yuma, Ariz., and Mojave, Cal., trace; Byron, Cal., 0.04 inch; Stockton, Cal., 0.05; Solidad, Cal., 0.07; Hot Springs, Nev., 0.08; Wickenburg, Ariz., 0.09; Camp Kellogg, Sumner and Tehachapi, Cal., Ft. Lincoln, Dak., and Boca, Nev., 0.10; Tracy, Cal., 0.15; Carson City, Nev., 0.17; Humboldt, Nev., 0.18; Benecia Barracks and Goshen, Cal., 0.19; Ft. Verde, Ariz., and Hollister, Cal., 0.20; Keene, Cal., 0.21; Tulare, Cal., 0.22; San Diego, Cal., 0.24; Modesto and Oakland, Cal., Flemington, N. J., and Phoenix, Ariz., 0.25; Mammoth Tank, Cal., 0.26; Davis and Salinas City, Cal., and Ft. Brooke Tampa, Fla., 0.28; Visalia, Cal., 0.31; Denver, 0.32; Prescott, Ariz., 0.33; Borden, Cal., and Benson, Ariz., 0.34; Merced and Spadra, Cal., and Ft. Wallace, Kan., 0.35; Fresno, Menlo Park, and Pt. San Jose, Cal., 0.36; Woodland, Cal., 0.37; Dunnigan and Niles, Cal., 0.38; Ft. Buford, Dak., and Galt, Cal., 0.39; South Valejo, Cal., and Toano, Nev., 0.40; Rio Vista, Cal., 0.41; Farmington, Cal., 0.44; Brighton, Cal., 0.45; Ft. Keogh, Mont., and Gilroy, Cal., 0.46; Willows, Cal., 0.47; Carlin, Nev., and Terrace, Utah, 0.48; Ione, Cal., and Coalville, Utah, 0.50.

Rainy Days.—The number varied in New England from 10 to 22; Middle Atlantic states, 7 to 17; South Atlantic states, 7 to 17; Florida Peninsula, 7 to 17; East Gulf states, 8 to 15; West Gulf states, 11 to 21; Rio Grande valley, 6 to 19; Ohio valley and Tennessee, 7 to 20; Lower Lake region, 18 to 21; Upper Lake region, 14 to 20; extreme Northwest, 7 to 14; Upper Mississippi valley, 9 to 20; Missouri valley, 8 to 16; Northern Slope, 5 to 13; Middle Slope, 3 to 12; Southern Slope, 6 to 13; Southern Plateau, 4 to 10; Middle Plateau, 4 to 9; Northern Plateau, 9 to 17; North Pacific region, 17 to 19; Middle Pacific region, 7 to 8; South Pacific region, 1 to 4.

Cloudy Days.—The number varied in New England from 6 to 17; Middle Atlantic states, 4 to 12; South Atlantic states, 5 to 9; Florida Peninsula, 0 to 4; East Gulf states, 6 to 10; West Gulf states, 3 to 14; Rio Grande valley, 8 to 15; Ohio valley and Tennessee, 7 to 14; Lower Lake region, 13 to 16; Upper Lake region, 12 to 18; extreme Northwest, 10 to 13; Upper Mississippi valley, 7 to 16; Missouri valley, 9 to 15; Northern Slope, 2 to 13; Middle Slope, 6 to 9; Southern Slope, 0 to 9; Southern Plateau, 1 to 4; Middle Plateau, 1 to 6; Northern Plateau, 4 to 19; North Pacific region, 12 to 18; Middle Pacific region, 1 to 3; South Pacific region, 0 to 4.

Snow.—The dates on which snow fell are most numerous in Dakota, Montana, Idaho and Wyoming territories, as follows: *Dakota*: 9th, 11th, 12th, 14th, 15th, 18th, 19th, 22d, 23d, 31st. *Montana*: 9th to 19th, 29th to 31st. *Idaho*: 11th to 17th, 31st. *Wyoming*: 12th, 16th, 21st to 23d, 26th, 28th, 31st. In the other states and territories it was reported from various stations on the following dates: Burlington, Vt., 26th; Eastport, Me., 5th, 26th; Bangor, Me., 5th; Mt. Washington, N. H., 5th, 12th, 15th, 18th, 23d to 27th; Portland, Me., 5th; Nashville, Tenn., 25th; Marquette, Mich., 9th, 10th, 14th, 17th, 19th, 25th; Duluth, Minn., 19th; Moorehead, Minn., 14th, 15th; Denver, Col., 31st; Ft. Apache, Ariz., 24th, 26th; Ft. Bayard, N. M., 27th; Salt Lake City, 14th; Winnemucca, Nev., 11th, 13th, 15th, 20th, 31st; Pioche, Nev., 25th; Colfax, Wash. T., 11th, 15th; Umatilla, Or., 11th; Dayton, Wash. T., 11th, 12th; Pomeroy, Wash. T., 10th, 12th; Spangle, Wash. T., 11th, 15th, 16th, 17th; Olympia, Wash. T., 11th; Portland, Or., 14th; Red Bluff, Cal., 4th; Ft. Bidwell, Cal., 3d, 5th, 10th, 13th, 15th, 27th, 29th, 31st; Ft. Lewis, Col., 24th, 26th, 28th, 31st; Pagosa Springs, Col., 24th, 26th, 31st; Ft. Brady, Mich., 9th, 14th, 17th; Ft. McDermitt, Nev., 12th, 27th, 30th; Ft. Wingate, N. M., 24th; Ft. Union, N. M., 29th, 31st; Plattsmonth Barracks, N. Y., 26th; Ft. Douglass, Utah, 13th, 20th, 28th; Franklin, Ark., 24th; Grafton, N. H., 5th; Charlotte, Vt., 26th; Lunenburg, Vt., 5th, 26th; Woodstock, Vt., 5th; New Tacoma, Wash. T., 14th; Newport, Vt., 5th; Stowe, Vt., 5th; Lewiston, Me., 5th; Wolboro, N. H., 5th; near Bradford, Pa., 5th; New Brunswick, 18th, in northern part of province fell to the depth of 10 inches; in Victoria and Restigouche counties 3 to 5 inches deep. Quebec, 18th, 8 inches fell during the night. Lawrence Co., N. Y., 10th, covering the ground. Chico, Cal., 13th; in the mountains first severe snow storm of the season; 12 inches fell on the Humboldt road. Salt Lake City, 20th, 21st, in mountains. Presque Isle, Me., 18th, fell to the depth of 9 inches.

Hail.—The usual diminution in the number of this class of storms as winter approaches is quite well marked for the month of October. Of the following small number reported, few were of any importance as regards severity: Winnemucca, 28th; Pioche, 25th; San Carlos, Ariz., 5th, 2 p. m. until 5.30 p. m., largest hail stones ever seen here; Ft. Lewis, Col., 6th, 24th; Holton, Kan., 14th; Clear Creek, Neb., 27th; De Soto, Neb., 16th; Albany, Or., 12th; Manitowoc, Wis., 6th.